

SEQUENCE LISTING

<110> Pettersson, Dan
Fuglsang, Claus Crone
Wu, Wenping

<120> Thermostable Enzyme Compositions

<130> 10254.204-US

<140> 10/500,477

<141> 2004-06-29

<160> 18

<170> PatentIn version 3.3

<210> 1

<211> 1008

<212> DNA

<213> Thermoascus aurantiacus

<220>

<221> sig_peptide

<222> (1)..(90)

<220>

<221> CDS

<222> (1)..(1005)

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Met Lys Leu Gly Ser Leu Val Leu Ala Leu Ser Ala Ala Arg Leu Thr	
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ctg tcg gcc cct ctc gca gac aga aag cag gag acc aag cgt gcg aaa	96
Leu Ser Ala Pro Leu Ala Asp Arg Lys Gln Glu Thr Lys Arg Ala Lys	
-10 -5 -1 1	

gta ttc caa tgg ttc ggt tcg aac gag tcc ggt gct gaa ttc gga agc	144
Val Phe Gln Trp Phe Gly Ser Asn Glu Ser Gly Ala Glu Phe Gly Ser	
5 10 15	

cag aac ctt cca gga gtc gag gga aag gat tat ata tgg cct gat ccc	192
Gln Asn Leu Pro Gly Val Glu Gly Lys Asp Tyr Ile Trp Pro Asp Pro	
20 25 30	

aac acc att gac aca ttg atc agc aag ggg atg aac atc ttt cgt gtc	240
Asn Thr Ile Asp Thr Leu Ile Ser Lys Gly Met Asn Ile Phe Arg Val	
35 40 45 50	

ccc ttt atg atg gag aga ttg gtt ccc aac tca atg acc ggc tct ccg	288
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Pro	Phe	Met	Met	Glu	Arg	Leu	Val	Pro	Asn	Ser	Met	Thr	Gly	Ser	Pro	
				55				60						65		
gat	ccg	aac	tac	ctg	gca	gat	ctc	ata	gcg	act	gta	aat	gca	atc	acc	336
Asp	Pro	Asn	Tyr	Leu	Ala	Asp	Leu	Ile	Ala	Thr	Val	Asn	Ala	Ile	Thr	
			70				75					80				
cag	aaa	ggg	gcc	tac	gcc	gtc	gtc	gat	cct	cat	aac	tac	ggc	aga	tac	384
Gln	Lys	Gly	Ala	Tyr	Ala	Val	Val	Asp	Pro	His	Asn	Tyr	Gly	Arg	Tyr	
		85					90					95				
tac	aat	tct	ata	atc	tcg	agc	cct	tcc	gat	ttc	cag	acc	ttc	tgg	aaa	432
Tyr	Asn	Ser	Ile	Ile	Ser	Ser	Pro	Ser	Asp	Phe	Gln	Thr	Phe	Trp	Lys	
	100					105					110					
acg	gtc	gcc	tca	cag	ttt	gct	tcg	aat	cca	ctg	gtc	atc	ttc	gac	act	480
Thr	Val	Ala	Ser	Gln	Phe	Ala	Ser	Asn	Pro	Leu	Val	Ile	Phe	Asp	Thr	
115					120					125					130	
aat	aac	gaa	tac	cac	gat	atg	gac	cag	acc	tta	gtc	ctc	aat	ctc	aac	528
Asn	Asn	Glu	Tyr	His	Asp	Met	Asp	Gln	Thr	Leu	Val	Leu	Asn	Leu	Asn	
				135				140						145		
cag	gcc	gct	atc	gac	ggc	atc	cgt	tcc	gcc	gga	gcc	act	tcc	cag	tac	576
Gln	Ala	Ala	Ile	Asp	Gly	Ile	Arg	Ser	Ala	Gly	Ala	Thr	Ser	Gln	Tyr	
			150					155					160			
atc	ttt	gtc	gag	ggc	aat	tcg	tgg	acc	ggg	gca	tgg	acc	tgg	acg	aac	624
Ile	Phe	Val	Glu	Gly	Asn	Ser	Trp	Thr	Gly	Ala	Trp	Thr	Trp	Thr	Asn	
		165					170					175				
gtg	aac	gat	aac	atg	aaa	agc	ctg	acc	gac	cca	tct	gac	aag	atc	ata	672
Val	Asn	Asp	Asn	Met	Lys	Ser	Leu	Thr	Asp	Pro	Ser	Asp	Lys	Ile	Ile	
	180					185					190					
tac	gag	atg	cac	cag	tac	ctg	gac	tct	gac	gga	tcc	ggg	aca	tca	gcg	720
Tyr	Glu	Met	His	Gln	Tyr	Leu	Asp	Ser	Asp	Gly	Ser	Gly	Thr	Ser	Ala	
195					200					205					210	
acc	tgc	gta	tct	tcg	acc	atc	ggg	caa	gag	cga	atc	acc	agc	gca	acg	768
Thr	Cys	Val	Ser	Ser	Thr	Ile	Gly	Gln	Glu	Arg	Ile	Thr	Ser	Ala	Thr	
				215				220						225		
cag	tgg	ctc	agg	gcc	aac	ggg	aag	aag	ggc	atc	atc	ggc	gag	ttt	gcg	816
Gln	Trp	Leu	Arg	Ala	Asn	Gly	Lys	Lys	Gly	Ile	Ile	Gly	Glu	Phe	Ala	
			230					235					240			
ggc	gga	gcc	aac	gac	gtc	tgc	gag	acg	gcc	atc	acg	ggc	atg	ctg	gac	864
Gly	Gly	Ala	Asn	Asp	Val	Cys	Glu	Thr	Ala	Ile	Thr	Gly	Met	Leu	Asp	
		245					250					255				
tac	atg	gcc	cag	aac	aca	gac	gtc	tgg	act	ggc	gcc	atc	tgg	tgg	gcg	912
Tyr	Met	Ala	Gln	Asn	Thr	Asp	Val	Trp	Thr	Gly	Ala	Ile	Trp	Trp	Ala	
	260					265					270					
gcc	ggg	ccg	tgg	tgg	gga	gac	tac	ata	ttc	tcc	atg	gag	ccg	gac	aat	960
Ala	Gly	Pro	Trp	Trp	Gly	Asp	Tyr	Ile	Phe	Ser	Met	Glu	Pro	Asp	Asn	

275	280	285	290	
ggc atc gcg tat cag cag ata ctt cct att ttg act ccg tat ctt tga				1008
Gly Ile Ala Tyr Gln Gln Ile Leu Pro Ile Leu Thr Pro Tyr Leu				
	295	300	305	

<210> 2
 <211> 335
 <212> PRT
 <213> Thermoascus aurantiacus

<400> 2

Met Lys Leu Gly Ser Leu Val Leu Ala Leu Ser Ala Ala Arg Leu Thr
-30 -25 -20 -15

Leu Ser Ala Pro Leu Ala Asp Arg Lys Gln Glu Thr Lys Arg Ala Lys
-10 -5 -1 1

Val Phe Gln Trp Phe Gly Ser Asn Glu Ser Gly Ala Glu Phe Gly Ser
5 10 15

Gln Asn Leu Pro Gly Val Glu Gly Lys Asp Tyr Ile Trp Pro Asp Pro
20 25 30

Asn Thr Ile Asp Thr Leu Ile Ser Lys Gly Met Asn Ile Phe Arg Val
35 40 45 50

Pro Phe Met Met Glu Arg Leu Val Pro Asn Ser Met Thr Gly Ser Pro
55 60 65

Asp Pro Asn Tyr Leu Ala Asp Leu Ile Ala Thr Val Asn Ala Ile Thr
70 75 80

Gln Lys Gly Ala Tyr Ala Val Val Asp Pro His Asn Tyr Gly Arg Tyr
85 90 95

Tyr Asn Ser Ile Ile Ser Ser Pro Ser Asp Phe Gln Thr Phe Trp Lys
100 105 110

Thr Val Ala Ser Gln Phe Ala Ser Asn Pro Leu Val Ile Phe Asp Thr
115 120 125 130

Asn Asn Glu Tyr His Asp Met Asp Gln Thr Leu Val Leu Asn Leu Asn
135 140 145

Gln Ala Ala Ile Asp Gly Ile Arg Ser Ala Gly Ala Thr Ser Gln Tyr
150 155 160

Ile Phe Val Glu Gly Asn Ser Trp Thr Gly Ala Trp Thr Trp Thr Asn
165 170 175

Val Asn Asp Asn Met Lys Ser Leu Thr Asp Pro Ser Asp Lys Ile Ile
180 185 190

Tyr Glu Met His Gln Tyr Leu Asp Ser Asp Gly Ser Gly Thr Ser Ala
195 200 205 210

Thr Cys Val Ser Ser Thr Ile Gly Gln Glu Arg Ile Thr Ser Ala Thr
215 220 225

Gln Trp Leu Arg Ala Asn Gly Lys Lys Gly Ile Ile Gly Glu Phe Ala
230 235 240

Gly Gly Ala Asn Asp Val Cys Glu Thr Ala Ile Thr Gly Met Leu Asp
245 250 255

Tyr Met Ala Gln Asn Thr Asp Val Trp Thr Gly Ala Ile Trp Trp Ala
260 265 270

Ala Gly Pro Trp Trp Gly Asp Tyr Ile Phe Ser Met Glu Pro Asp Asn
275 280 285 290

Gly Ile Ala Tyr Gln Gln Ile Leu Pro Ile Leu Thr Pro Tyr Leu
295 300 305

<210> 3
<211> 21
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<213> Thermoascus aurantiacus

<220>
<221> MISC_FEATURE
<223> N-terminal peptide

<220>
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<222> (2)..(2)
<223> Xaa in position 2 means any amino acid

<400> 3

Asn	Xaa	Leu	Val	Phe	Thr	Ser	Phe	Gly	Ser	Asn	Glu	Ser	Gly	Ala	Glu
1				5				10						15	

Phe	Gly	Ser	Gln	Asn
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<223> Primer

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<222> (9)..(9)
<223> n is a, c, g, or t

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<220>
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<223> n is a, c, g, or t

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<222> (15)..(15)
<223> n is a, c, g, or t

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aaygartcng gngcngaatt

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20

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<211> 20
<212> DNA
<213> Artificial

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<220>
<223> Primer

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aaygartcng gngcngagtt

20

<210> 6
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20

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aaygaragkg gngcngagtt

20

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aagatgtact ggggaagtg	18
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tggttgagat tgaggactaa g	21
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gattatagaa ttgtagtatt t	21
<210> 11	
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agagccgggtc attgagttg	19
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21

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 -10 -5 -1 1

Thr Thr Pro Asn Ser Glu Gly Trp His Asp Gly Tyr Tyr Tyr Ser Trp
 5 10 15

Trp Ser Asp Gly Gly Ala Gln Ala Thr Tyr Thr Asn Leu Glu Gly Gly
 20 25 30

Thr Tyr Glu Ile Ser Trp Gly Asp Gly Gly Asn Leu Val Gly Gly Lys
 35 40 45 50

Gly Trp Asn Pro Gly Leu Asn Ala Arg Ala Ile His Phe Glu Gly Val
 55 60 65

Tyr Gln Pro Asn Gly Asn Ser Tyr Leu Ala Val Tyr Gly Trp Thr Arg
 70 75 80

Asn Pro Leu Val Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr Asp
 85 90 95

Pro Ser Ser Gly Ala Thr Asp Leu Gly Thr Val Glu Cys Asp Gly Ser

100	105	110
Ile Tyr Arg Leu Gly Lys Thr Thr Arg Val Asn Ala Pro Ser Ile Asp		
115	120	125 130
Gly Thr Gln Thr Phe Asp Gln Tyr Trp Ser Val Arg Gln Asp Lys Arg		
	135	140 145
Thr Ser Gly Thr Val Gln Thr Gly Cys His Phe Asp Ala Trp Ala Arg		
	150	155 160
Ala Gly Leu Asn Val Asn Gly Asp His Tyr Tyr Gln Ile Val Ala Thr		
	165	170 175
Glu Gly Tyr Phe Ser Ser Gly Tyr Ala Arg Ile Thr Val Ala Asp Val		
	180	185 190
Gly		
195		
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Ser Leu Ala Leu Ser Thr Gly Pro Ser Pro Val Ala Ala Gly Leu Pro		
	-10	-5 -1 1
Ile Pro Ala Gly Ala Thr Ser Ala Thr Gly Pro Thr Ala Pro Pro Pro		
	5 10	15
Pro Val Gly Pro Thr Ala Ala Pro Pro Gly Gly Cys Thr Val Thr Gly		
	20	25 30
Val Ala Leu Ile Gly Ala His Gly Ala Ala Thr Pro Thr Ser Gly Ala		
35	40	45 50

Ala Ser Ala Gly Val Ala Ala Val Ala Leu Ile Gly Met Ala Ala Pro
55 60 65

Pro Thr Ala Pro Leu Thr Gly Pro Leu Ala Ala Pro Val Thr Leu Pro
70 75 80

Gly Val Ala Ala Leu Leu Pro Pro Gly Ala Ala Gly Ser His Gly Thr
85 90 95

Gly Thr Ala Met Thr Thr Ala Thr Ser Thr Leu Pro Gly Gly Gly Ala
100 105 110

Val Pro Pro Val Ala Ala Ala Gly Ala Gly Ala Val Val Ala Ser Ser
115 120 125 130

Thr Ala Thr Thr Ala Gly Pro Gly Ala Ala Ser Gly Gly Thr Val Leu
135 140 145

Pro Thr Leu Gly Val Val Leu Gly Gly Gly Gly Ala Cys Thr Leu Cys
150 155 160

Ala Ala Met Cys Pro Ala Gly Val Ala Gly Ala Gly Ser Thr Thr Thr
165 170 175

Leu Gly Val Pro Ala Pro Ala Ile Thr Ala Ala Leu Ala Ala Ala Ala
180 185 190

Pro Ser Ala Ala Leu Ser Ala Ser Ala Ala Leu Thr Leu Met Ala Met
195 200 205 210

Cys Pro Pro Ala Thr Leu Ser Ser Gly Ala Ala Ser Pro Pro Cys Ala
215 220 225

Leu Pro Thr Ala Gly Gly Thr Val Ser Thr Gly Thr Thr Thr Ala Leu
230 235 240

Ala Leu Thr Thr Gly Thr Gly Pro Gly Ala Ala Leu Gly Pro Val Gly
245 250 255

Gly Val Gly Thr Val Ala Gly Leu Leu Ala Ala Leu Thr Gly Gly Ala
260 265 270

Val Ala Ala Gly Thr Gly Thr Ala Ala Thr Leu Ala Ser Ala Pro Ala
 275 280 285 290

Thr Pro Pro Leu Ala Ala Thr Pro Thr Ala Ala Pro Ser His Ala Ala
 295 300 305

Thr Met Val Pro Ile Pro Ala Ala Leu Gly Leu Pro Ala Ala Thr Ala
 310 315 320

Leu Ala Pro Leu Leu Pro Ala Gly Ala Ala Leu Thr Val Ala Ser Leu
 325 330 335

Leu Val Pro Pro Ser Gly His Met Thr Val Gly Leu Leu Ala Cys Ser
 340 345 350

Gly Leu Gly Ala Val Ala Val Leu Val Ala Ala Ala Val Gly Pro Leu
 355 360 365 370

Gly Pro Cys Gly Gly Val Ala Gly Val Cys Gly Leu Ser Ala Pro Val
 375 380 385

Gly Ser Gly Thr Thr Ala Ala Gly Ala Gly Gly Gly Ala Pro Ala Leu
 390 395 400

Cys Gly Pro Val Pro Ser Gly
 405

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 <213> Myceliophthora thermophila

<220>
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Ala Leu Thr Tyr Arg Gly Val Asp Trp Ser Ser Val Val Val Glu Glu
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 20 25 30

Glu Asn Ile Leu Ala Ala Asn Gly Val Asn Thr Val Arg Gln Arg Val
 35 40 45

Trp Val Asn Pro Ala Asp Gly Asn Tyr Asn Leu Asp Tyr Asn Ile Ala
 50 55 60

Ile Ala Lys Arg Ala Lys Ala Ala Gly Leu Gly Val Tyr Ile Asp Phe
 65 70 75 80

His Tyr Ser Asp Thr Trp Ala Asp Pro Ala His Gln Thr Met Pro Ala
 85 90 95

Gly Trp Pro Ser Asp Ile Asp Asn Leu Ser Trp Lys Leu Tyr Asn Tyr
 100 105 110

Thr Leu Asp Ala Ala Asn Lys Leu Gln Asn Ala Gly Ile Gln Pro Thr
 115 120 125

Ile Val Ser Ile Gly Asn Glu Ile Arg Ala Gly Leu Leu Trp Pro Thr
 130 135 140

Gly Arg Thr Glu Asn Trp Ala Asn Ile Ala Arg Leu Leu His Ser Ala
 145 150 155 160

Ala Trp Gly Ile Lys Asp Ser Ser Leu Ser Pro Lys Pro Lys Ile Met
 165 170 175

Ile His Leu Asp Asn Gly Trp Asp Trp Gly Thr Gln Asn Trp Trp Tyr
 180 185 190

Thr Asn Val Leu Lys Gln Gly Thr Leu Glu Leu Ser Asp Phe Asp Met
 195 200 205

Met Gly Val Ser Phe Tyr Pro Phe Tyr Ser Ser Ser Ala Thr Leu Ser
 210 215 220

Ala Leu Lys Ser Ser Leu Asp Asn Met Ala Lys Thr Trp Asn Lys Glu
 225 230 235 240

Ile Ala Val Val Glu Thr Asn Trp Pro Ile Ser Cys Pro Asn Pro Arg
 245 250 255

Tyr Ser Phe Pro Ser Asp Val Lys Asn Ile Pro Phe Ser Pro Glu Gly

260 265 270
 Gln Thr Thr Phe Ile Thr Asn Val Ala Asn Ile Val Ser Ser Val Ser
 275 280 285
 Arg Gly Val Gly Leu Phe Tyr Trp Glu Pro Ala Trp Ile His Asn Ala
 290 295 300
 Asn Leu Gly Ser Ser Cys Ala Asp Asn Thr Met Phe Ser Gln Ser Gly
 305 310 315 320
 Gln Ala Leu Ser Ser Leu Ser Val Phe Gln Arg Ile
 325 330

<210> 17
 <211> 1008
 <212> DNA
 <213> *Thermoascus aurantiacus*

<220>
 <221> CDS
 <222> (1)..(1005)

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<220>
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 ctg tcg gcc cct ctc gca gac aga aag cag gag acc aag cgt gcg aaa 96
 Leu Ser Ala Pro Leu Ala Asp Arg Lys Gln Glu Thr Lys Arg Ala Lys
 -15 -10 -5 -1
 gta ttc caa tgg ttc ggt tcg aac gag tcc ggt gct gaa ttc gga agc 144
 Val Phe Gln Trp Phe Gly Ser Asn Glu Ser Gly Ala Glu Phe Gly Ser
 1 5 10 15
 cag aac ctt cca gga gtc gag gga aag gat tat ata tgg cct gat ccc 192
 Gln Asn Leu Pro Gly Val Glu Gly Lys Asp Tyr Ile Trp Pro Asp Pro
 20 25 30
 aac acc att gac aca ttg atc agc aag ggg atg aac atc ttt cgt gtc 240
 Asn Thr Ile Asp Thr Leu Ile Ser Lys Gly Met Asn Ile Phe Arg Val
 35 40 45

ccc ttt atg atg gag aga ttg gtt ccc aac tca atg acc ggc tct ccg	288
Pro Phe Met Met Glu Arg Leu Val Pro Asn Ser Met Thr Gly Ser Pro	
50 55 60	
gat ccg aac tac ctg gca gat ctc ata gcg act gta aat gca atc acc	336
Asp Pro Asn Tyr Leu Ala Asp Leu Ile Ala Thr Val Asn Ala Ile Thr	
65 70 75 80	
cag aaa ggt gcc tac gcc gtc gtc gat cct cat aac tac ggc aga tac	384
Gln Lys Gly Ala Tyr Ala Val Val Asp Pro His Asn Tyr Gly Arg Tyr	
85 90 95	
tac aat tct ata atc tcg agc cct tcc gat ttc cag acc ttc tgg aaa	432
Tyr Asn Ser Ile Ile Ser Ser Pro Ser Asp Phe Gln Thr Phe Trp Lys	
100 105 110	
acg gtc gcc tca cag ttt gct tcg aat cca ctg gtc atc ttc gac act	480
Thr Val Ala Ser Gln Phe Ala Ser Asn Pro Leu Val Ile Phe Asp Thr	
115 120 125	
aat aac gaa tac cac gat atg gac cag acc tta gtc ctc aat ctc aac	528
Asn Asn Glu Tyr His Asp Met Asp Gln Thr Leu Val Leu Asn Leu Asn	
130 135 140	
cag gcc gct atc gac ggc atc cgt tcc gcc gga gcc act tcc cag tac	576
Gln Ala Ala Ile Asp Gly Ile Arg Ser Ala Gly Ala Thr Ser Gln Tyr	
145 150 155 160	
atc ttt gtc gag ggc aat tcg tgg acc ggg gca tgg acc tgg acg aac	624
Ile Phe Val Glu Gly Asn Ser Trp Thr Gly Ala Trp Thr Trp Thr Asn	
165 170 175	
gtg aac gat aac atg aaa agc ctg acc gac cca tct gac aag atc ata	672
Val Asn Asp Asn Met Lys Ser Leu Thr Asp Pro Ser Asp Lys Ile Ile	
180 185 190	
tac gag atg cac cag tac ctg gac tct gac gga tcc ggg aca tca gcg	720
Tyr Glu Met His Gln Tyr Leu Asp Ser Asp Gly Ser Gly Thr Ser Ala	
195 200 205	
acc tgc gta tct tcg acc atc ggt caa gag cga atc acc agc gca acg	768
Thr Cys Val Ser Ser Thr Ile Gly Gln Glu Arg Ile Thr Ser Ala Thr	
210 215 220	
cag tgg ctc agg gcc aac ggg aag aag ggc atc atc ggc gag ttt gcg	816
Gln Trp Leu Arg Ala Asn Gly Lys Lys Gly Ile Ile Gly Glu Phe Ala	
225 230 235 240	
ggc gga gcc aac gac gtc tgc gag acg gcc atc acg ggc atg ctg gac	864
Gly Gly Ala Asn Asp Val Cys Glu Thr Ala Ile Thr Gly Met Leu Asp	
245 250 255	
tac atg gcc cag aac aca gac gtc tgg act ggc gcc atc tgg tgg gcg	912
Tyr Met Ala Gln Asn Thr Asp Val Trp Thr Gly Ala Ile Trp Trp Ala	
260 265 270	

gcc ggg ccg tgg tgg gga gac tac ata ttc tcc atg gag ccg gac aat 960
 Ala Gly Pro Trp Trp Gly Asp Tyr Ile Phe Ser Met Glu Pro Asp Asn
 275 280 285

ggc atc gcg tat cag cag ata ctt cct att ttg act ccg tat ctt tga 1008
 Gly Ile Ala Tyr Gln Gln Ile Leu Pro Ile Leu Thr Pro Tyr Leu
 290 295 300

<210> 18
 <211> 335
 <212> PRT
 <213> Thermoascus aurantiacus

<400> 18

Met Lys Leu Gly Ser Leu Val Leu Ala Leu Ser Ala Ala Arg Leu Thr
 -30 -25 -20

Leu Ser Ala Pro Leu Ala Asp Arg Lys Gln Glu Thr Lys Arg Ala Lys
 -15 -10 -5 -1

Val Phe Gln Trp Phe Gly Ser Asn Glu Ser Gly Ala Glu Phe Gly Ser
 1 5 10 15

Gln Asn Leu Pro Gly Val Glu Gly Lys Asp Tyr Ile Trp Pro Asp Pro
 20 25 30

Asn Thr Ile Asp Thr Leu Ile Ser Lys Gly Met Asn Ile Phe Arg Val
 35 40 45

Pro Phe Met Met Glu Arg Leu Val Pro Asn Ser Met Thr Gly Ser Pro
 50 55 60

Asp Pro Asn Tyr Leu Ala Asp Leu Ile Ala Thr Val Asn Ala Ile Thr
 65 70 75 80

Gln Lys Gly Ala Tyr Ala Val Val Asp Pro His Asn Tyr Gly Arg Tyr
 85 90 95

Tyr Asn Ser Ile Ile Ser Ser Pro Ser Asp Phe Gln Thr Phe Trp Lys
 100 105 110

Thr Val Ala Ser Gln Phe Ala Ser Asn Pro Leu Val Ile Phe Asp Thr
 115 120 125

Asn Asn Glu Tyr His Asp Met Asp Gln Thr Leu Val Leu Asn Leu Asn

130		135		140
Gln Ala Ala Ile Asp Gly Ile Arg Ser Ala Gly Ala Thr Ser Gln Tyr				
145		150		155 160
Ile Phe Val Glu Gly Asn Ser Trp Thr Gly Ala Trp Thr Trp Thr Asn				
	165		170	175
Val Asn Asp Asn Met Lys Ser Leu Thr Asp Pro Ser Asp Lys Ile Ile				
	180		185	190
Tyr Glu Met His Gln Tyr Leu Asp Ser Asp Gly Ser Gly Thr Ser Ala				
	195		200	205
Thr Cys Val Ser Ser Thr Ile Gly Gln Glu Arg Ile Thr Ser Ala Thr				
	210		215	220
Gln Trp Leu Arg Ala Asn Gly Lys Lys Gly Ile Ile Gly Glu Phe Ala				
225		230		235 240
Gly Gly Ala Asn Asp Val Cys Glu Thr Ala Ile Thr Gly Met Leu Asp				
	245		250	255
Tyr Met Ala Gln Asn Thr Asp Val Trp Thr Gly Ala Ile Trp Trp Ala				
	260		265	270
Ala Gly Pro Trp Trp Gly Asp Tyr Ile Phe Ser Met Glu Pro Asp Asn				
	275		280	285
Gly Ile Ala Tyr Gln Gln Ile Leu Pro Ile Leu Thr Pro Tyr Leu				
	290		295	300